

REMARKS

Favorable reconsideration of this application, in light of the preceding amendments and following remarks, is respectfully requested. Claims 9-14 and 16 are pending in this application. No claims have been amended and claim 15 has been cancelled. Claim 9 is the independent claim.

Applicants note with appreciation the Examiner's acknowledgement that certified copies of all priority documents have been received by the U.S.P.T.O. Action, summary at 12.

Applicants also respectfully note the present action indicates that the drawings have been accepted by the Examiner. Action, summary at 10.

Example Embodiments of the Present Application

Example embodiments are directed to pore or particle-size distribution measurement methods for measuring size distribution of pores or particles existing within a porous insulator film formed on a surface of a substrate. The method of one embodiment includes irradiating the insulator film with X-rays from the insulator film's surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film and larger than 1.0 times a total-reflection critical angle of the substrate but less than 1.3 times a total-reflection critical angle of the substrate. The method of another embodiment includes irradiating X-rays from the insulator film's surface side at an incident angle set to be larger than a total-reflection critical angle of an

uppermost surface layer, and a two-dimensional position-sensitive detector for detecting scattered X-rays.

In a region where the incident angle θ_i is smaller than a critical angle θ_{c-f} of the insulator film, the X-rays undergo total reflection on the surface of the insulator film. As a result, no X-rays are able to enter the insulator film, making it difficult or impossible to achieve measurement. Moreover, in a case where the incident angle θ_i is larger than the critical angle θ_{c-f} but smaller than a total-reflection critical angle θ_{c-s} of the substrate, the X-rays undergo total reflection once on the substrate. As a result, after the reflection, the components scattered by a pore Y are superimposed intensely, making it difficult to achieve measurement. If measurement cannot be achieved easily in a region where the scattering angle is small, determining distribution in a region where the pore size is larger may be difficult.

Rejections under 35 U.S.C. § 102

Koppel

Claims 9 and 13 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,507,634 to Koppel et al. ("Koppel"). Applicants respectfully traverse this rejection for the reasons detailed below.

The Office Action stated that, regarding claim 9, Koppel discloses a method comprising irradiating the insulator film with x-rays from the insulator film's surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film and larger than 1.0 times a total-

reflection critical angle of a substrate but less than 1.3 times a total-reflection critical angle of the substrate, and necessarily detecting among reflection components reflected on the surface of the substrate of the x-rays which have entered the insulator film, reflection components exiting from the insulator film after entering the pore or particle and scattering, having an exit angle larger than that of reflection components which exit from the insulator film without entering the pore or particle. In the Response to Arguments section, the Examiner states that Koppel shows a critical angle of the insulator 306 and critical angle of the substrate 308, the reflection angle increases as the incident angle is changed, and the angle of incidence goes through a range of angles. Applicants respectfully disagree.

According to Koppel, a sample is irradiated with X-rays in multiple directions, and thus, X-rays reflected at multiple angles corresponding to the incident angles enter the detector. In this situation, though scattered X-rays to be detected also enter the detector, Applicants respectfully submit that the detector is not capable of distinguishing the scattered X-rays from the reflected X-rays, because the amount of the reflected X-rays is very large relative to that of the scattered X-rays. Therefore, limiting the incident angle to only one, that is, using a single irradiation angle is technically very advantageous. Further, Koppel describes "[t]he invention uses information in the region between the two critical angles 306 and 308 (defined as region B above)" at col. 3, lines 53-54. In Fig. 3 of Koppel, the reference numeral 306 denotes the critical angle of the substrate. Thus, the angle within the region B of Koppel is larger than the

critical angle of the insulator but is not larger than 1.0 times the critical angle of the substrate, unlike claim 9. Therefore, the Examiners position stating that Koppel discloses the feature of claim 9 is improper.

Therefore, Applicants submit that Koppel does not teach or suggest “irradiating the insulator film with X-rays from the insulator film’s surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film and larger than 1.0 times a total-reflection critical angle of the substrate but less than 1.3 times a total-reflection critical angle of the substrate” as recited in claim 9.

The Applicants, therefore, respectfully request that the rejection to Claim 9 under 35 U.S.C. § 102(e) be withdrawn.

Claim 13, dependent on independent claim 9, is patentable for the reasons stated above with respect to claim 9 as well as for its own merits.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection to independent claim 9 and all claims dependent thereon.

Rejections under 35 U.S.C. § 103

Koppel in view of Houtman

Claim 10 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Koppel in view of U.S. Patent No. 5,446,777 to Houtman. Applicants respectfully traverse this rejection for the reasons detailed below.

Even assuming *arguendo* that Koppel could be combined with Houtman (which Applicants do not admit), the Examiner has failed to show how Houtman remedies the deficiencies of Koppel with respect to independent claim 9. Thus, claim 10 is patentable over Koppel and Houtman for the reasons set forth above with respect to independent claim 9.

The Applicants, therefore, respectfully request that the rejection to Claim 10 under 35 U.S.C. §103(a) be withdrawn.

Koppel in view of Mazor

Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Koppel in view of U.S. Patent No. 6,556,652 to Mazor et al. ("Mazor"). Applicants respectfully traverse this rejection for the reasons detailed below.

Even assuming *arguendo* that Mazor could be combined with Koppel (which Applicants do not admit), the Examiner has failed to show how Mazor remedies the deficiencies of Koppel with respect to independent claim 9. Thus, claim 11 is patentable over Koppel and Mazor for the reasons set forth above with respect to independent claim 9.

The Applicants, therefore, respectfully request that the rejection to Claim 11 under 35 U.S.C. §103(a) be withdrawn.

Koppel in view of Yokhin

Claim 14 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Koppel in view of U.S. Patent Publication No. 2002/0150209 to Yokhin. Applicants respectfully traverse this rejection for the reasons detailed below.

Even assuming *arguendo* that Yokhin could be combined with Koppel (which Applicants do not admit), the Examiner has failed to show how Yokhin remedies the deficiencies of Koppel with respect to independent claim 9. Thus, claim 14 is patentable over Koppel and Yokhin for the reasons set forth above with respect to independent claim 9.

The Applicants, therefore, respectfully request that the rejection to Claim 14 under 35 U.S.C. §103(a) be withdrawn.

Koppel in view of Koppel

Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Koppel in view of U.S. Patent No. 5,619,549 to Koppel ("Koppel 2").

Claim 15 has been cancelled, and therefore, the rejection of claim 15 is now moot. The Applicants, therefore, respectfully request that the rejection to Claim 15 under 35 U.S.C. § 103(a) be withdrawn.

CONCLUSION

In view of the above remarks and amendments, the Applicants respectfully submit that each of the pending objections and rejections has been addressed and overcome, placing the present application in condition for allowance. A notice to that effect is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact the undersigned.

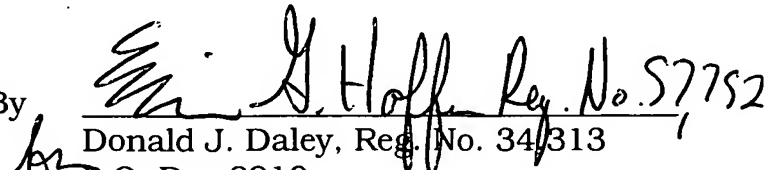
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Erin G. Hoffman, Reg. No. 57,752, at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY, & PIERCE, P.L.C.

By


Donald J. Daley, Reg. No. 34,313
P.O. Box 8910
Reston, Virginia 20195
(703) 668-8000

DJD/EGH:ljs:dmc